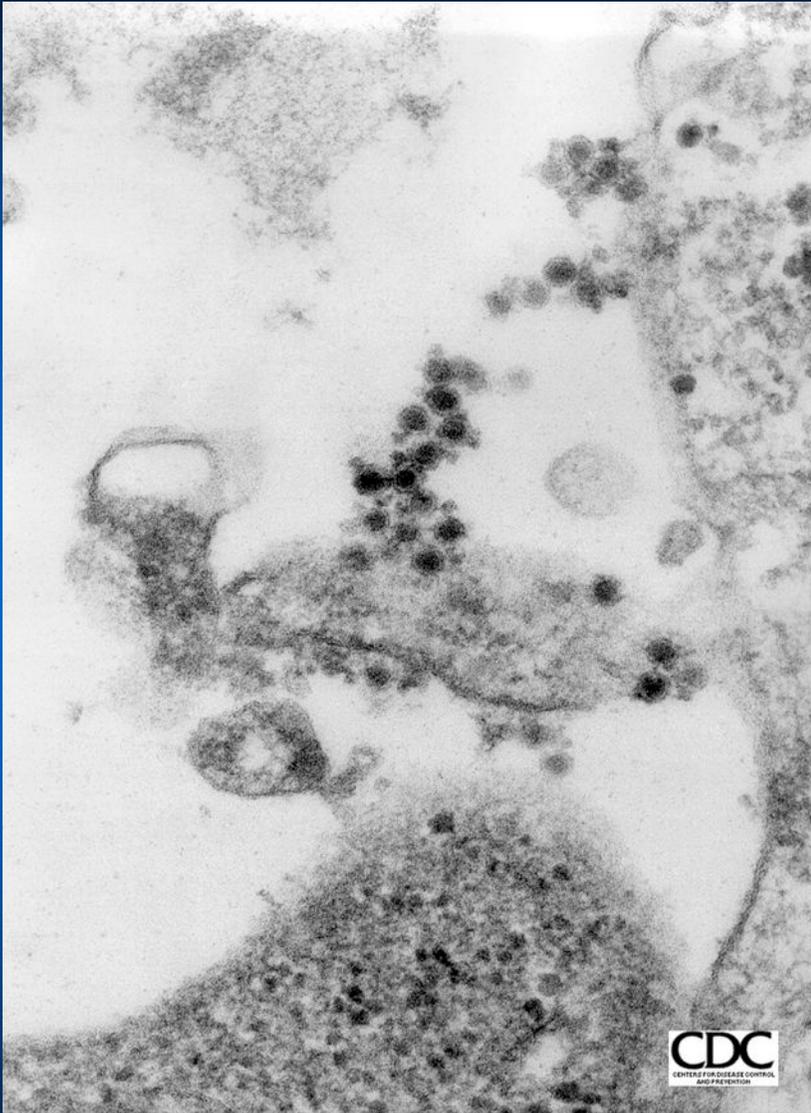
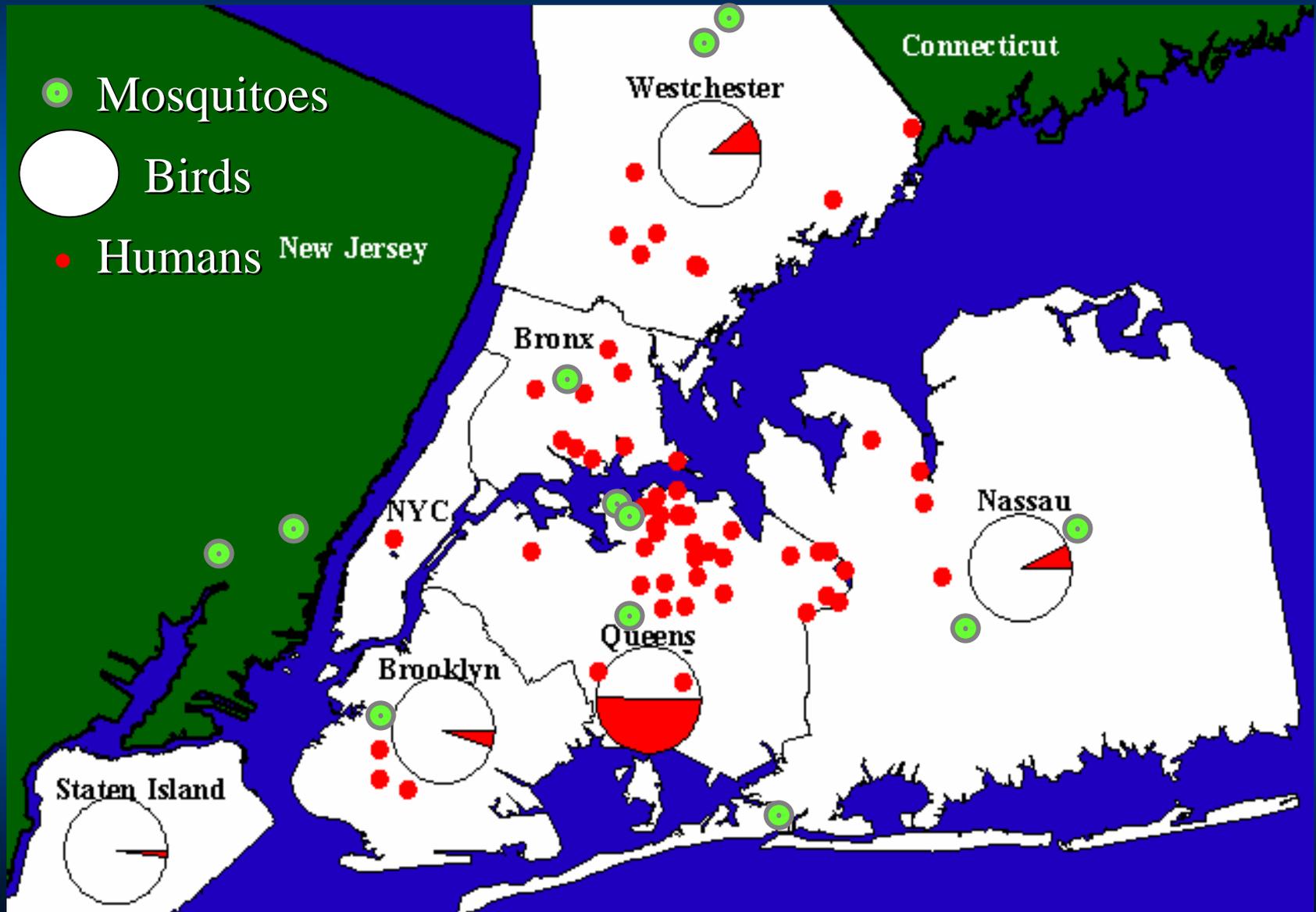


West Nile Virus In the United States 1999-2004

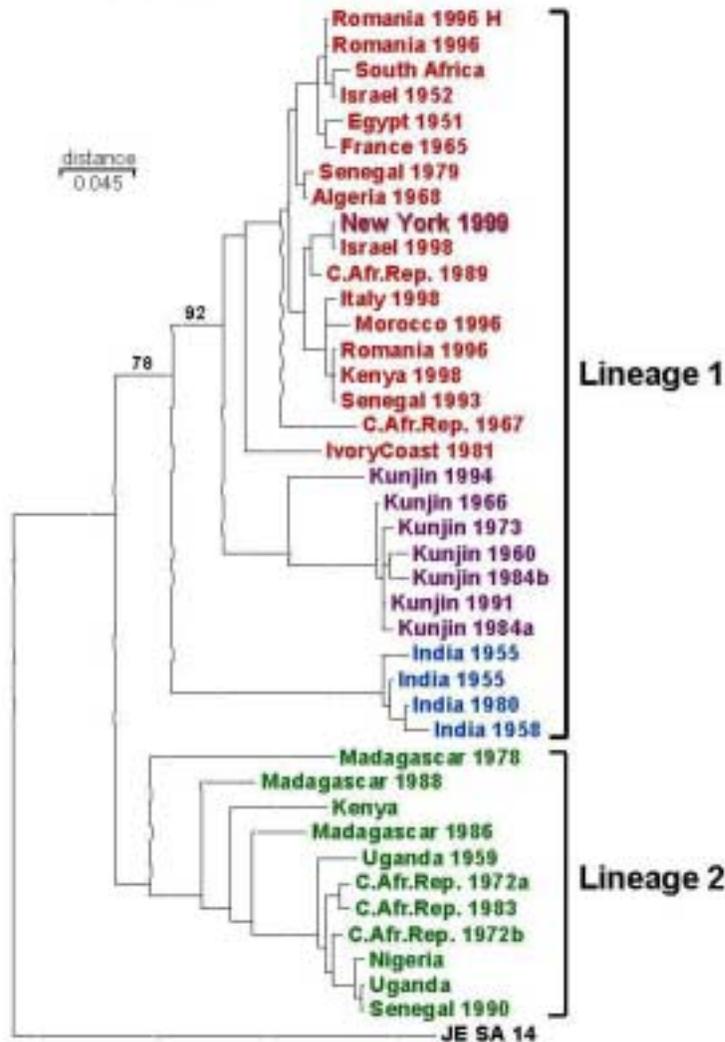


1999 – In the beginning...

... there was WNV in the NYC area



Phylogenetic Tree Based on Envelope Glycoprotein Sequence Data



Lanciotti et al. 1999. Origin of the West Nile virus responsible for an outbreak of encephalitis in the northeastern U.S. [Science 286:2333-337.]

Response to WNV Outbreak

SPORTS
Newsday

http://www.newsday.com SATURDAY, SEPT. 11, 1999 • QUEENS 50



City Department of health worker Juli Casio pours chlorine in a stagnant Whitestone swimming pool to follow what Robert Kim looks on.

'An Excess Of Caution'

Giuliani Defends City's Extensive Attack on Mosquitoes
Suspected Encephalitis Cases Now Total 62 / Page A5

NEW YORK POST HOME DELIVERY 1-800-552-7678 CALL TODAY!

SPORTS EXTRA

SEPTEMBER 12, 1999 / Bronx \$2 / Western Post \$3

http://www.nypost.com/

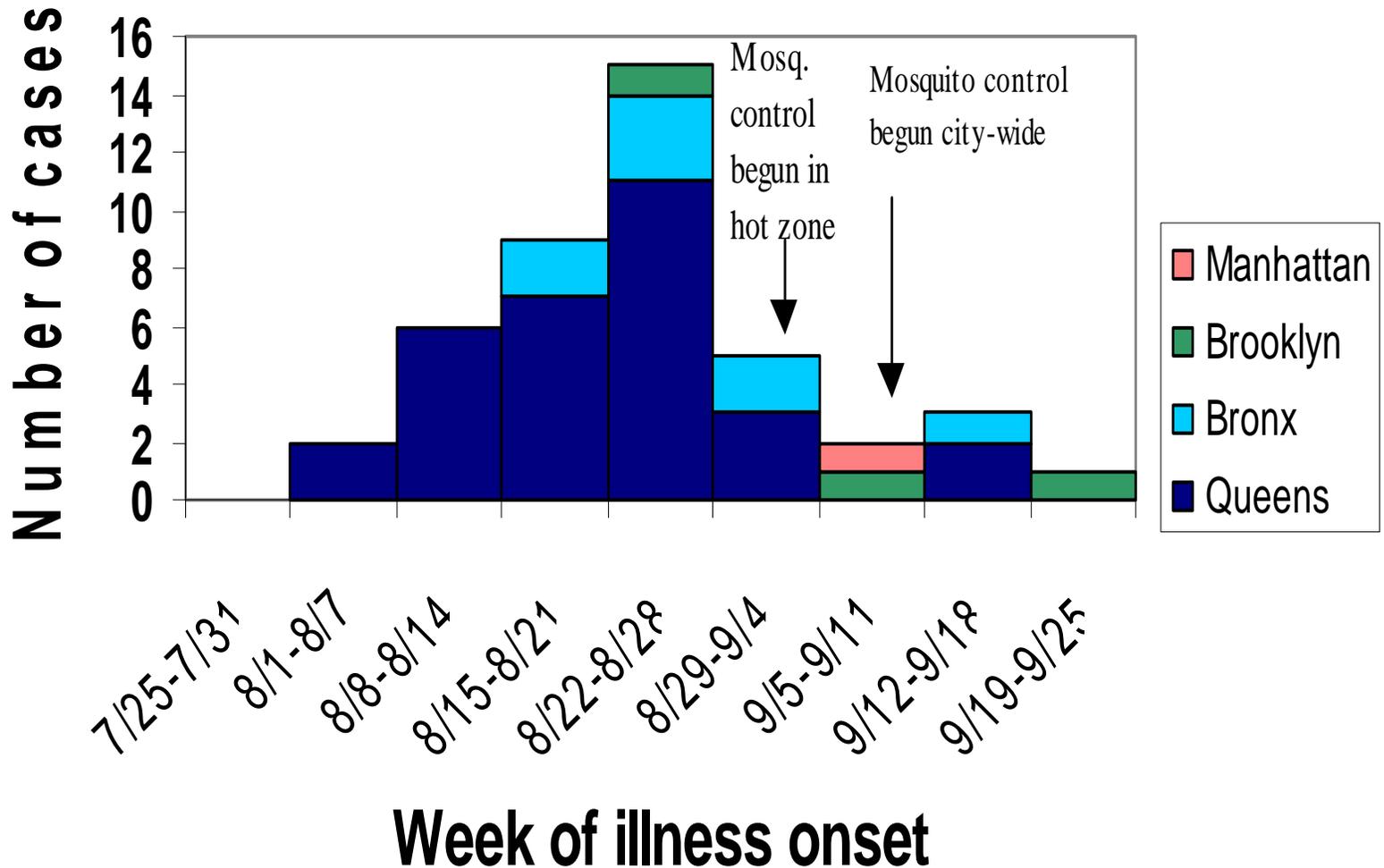


LET US SPRAY!

Citywide war on mosquitoes

PAGES 4-7

Seropositive cases of WNV in NYC by borough, 1999



1999 Verified WNV Surveillance Reports

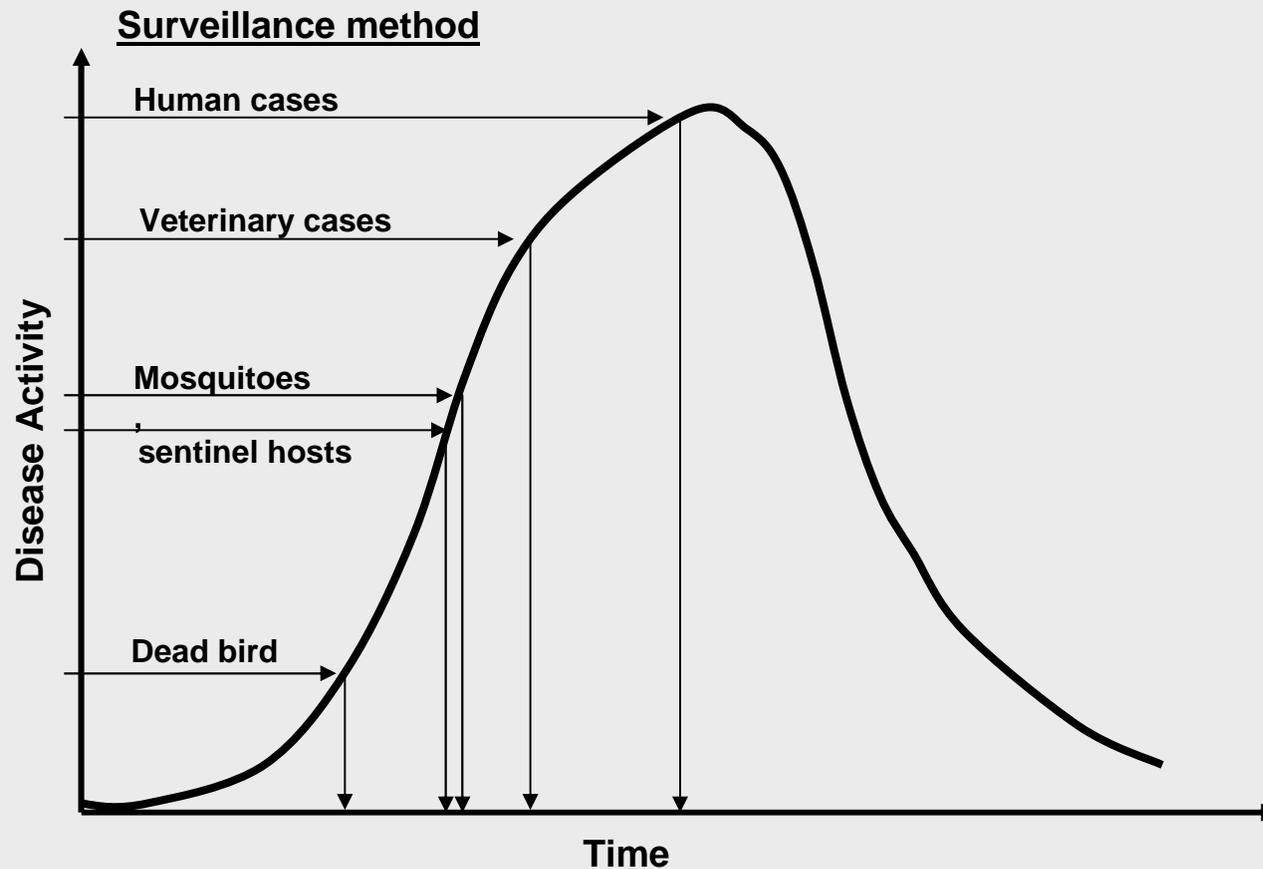
Year	States	Humans/ Fatalities	Birds	Mosquito Pools	Horses
1999	4	62/6	?	16	25

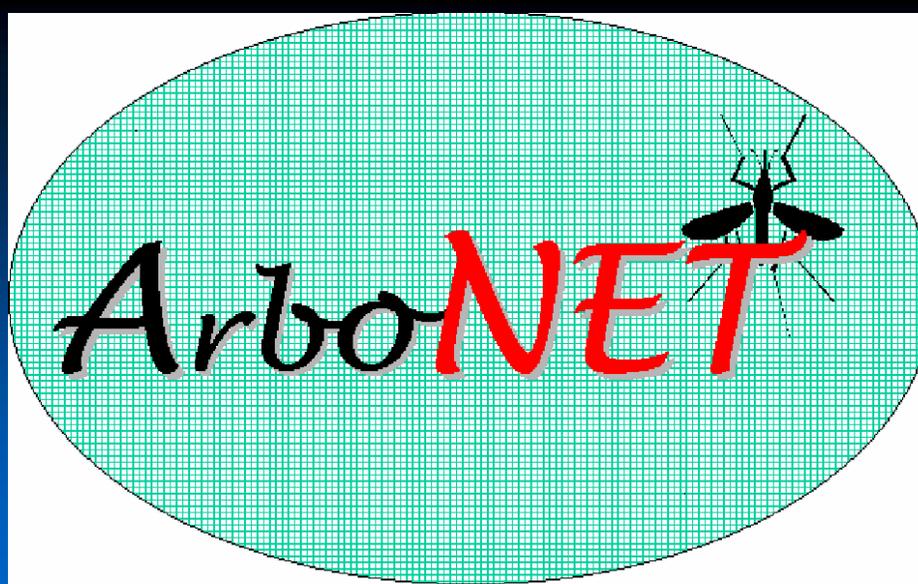
- Household-based human serosurvey in Queens determines 2.6% seroprevalence
- WNV infected mosquitoes trapped in Ft. Totten, suggesting overwintering of WNV

2000 – Its back!
Or
The year of the Corvid

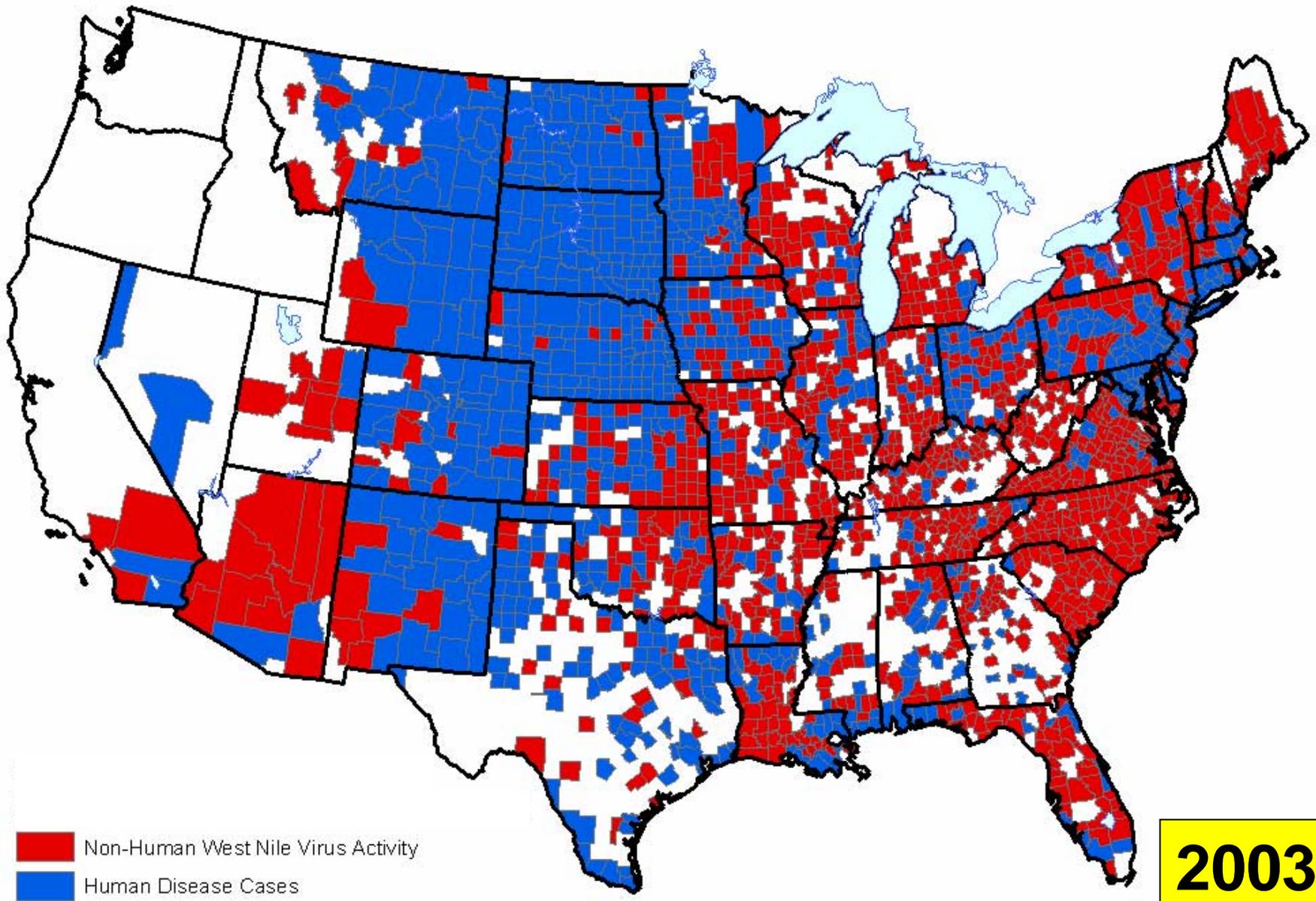


Estimated Sensitivity of West Nile Virus Surveillance Methods





- 57 cooperating local, state, & territorial health departments
- “Real-time” arbovirus surveillance
 - Humans
 - Animals (mosquitoes, dead birds, sentinel species, non-human mammals)
- Web-based reporting



 Non-Human West Nile Virus Activity
 Human Disease Cases

2003

National Center for Infectious Diseases

West Nile Virus Activity

Cumulative results for 2003 calendar year reported as of October 24, 2003



2000 Verified WNV Surveillance Reports

Year	States	Humans/ Fatalities	Birds	Mosquito Pools	Horses
1999	4	62/6	?	16	25
2000	11 + DC	21/2	4305	515	63

- Field-studies determine that dead crow=enzootic WNV foci
- Household-based serosurveys identify seroprevalence in Staten Island, Suffolk Cty, and Fairfield Cty, CT, to be lower than Queens in 1999.

2001 – The calm before the storm

2001 Verified WNV Surveillance Reports

Year	States	Humans/ Fatalities	Birds	Mosquito Pools	Horses
1999	4	62/6	?	16	25
2000	11 + DC	21/2	4305	515	63
2001	27+DC	66/9	7332	919	731

- First major outbreaks in the south, GA and FL

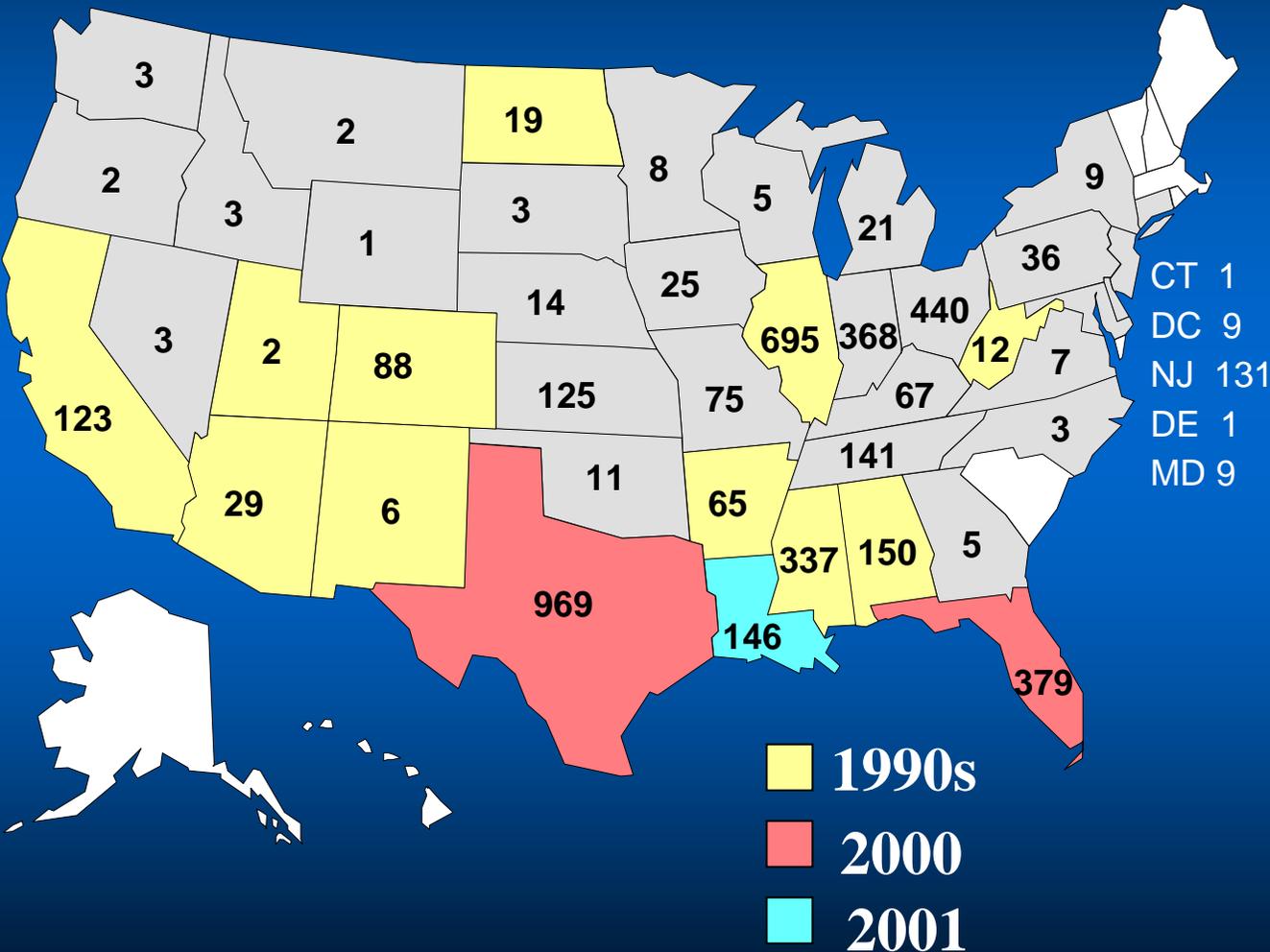
2002a – Shades of 1975!
Or
It's a bad year to be a horse

2002 Verified WNV Surveillance Reports

Year	States	Humans/ Fatalities	Birds	Mosquito Pools	Horses
1999	4	62/6	?	16	25
2000	11 + DC	21/2	4305	515	63
2001	27+DC	66/9	7332	919	731
2002	44 + DC	4156/284	15941	6604	14571

- Horse vaccine becoming available

Human SLE Case Distribution by State 1964-2001

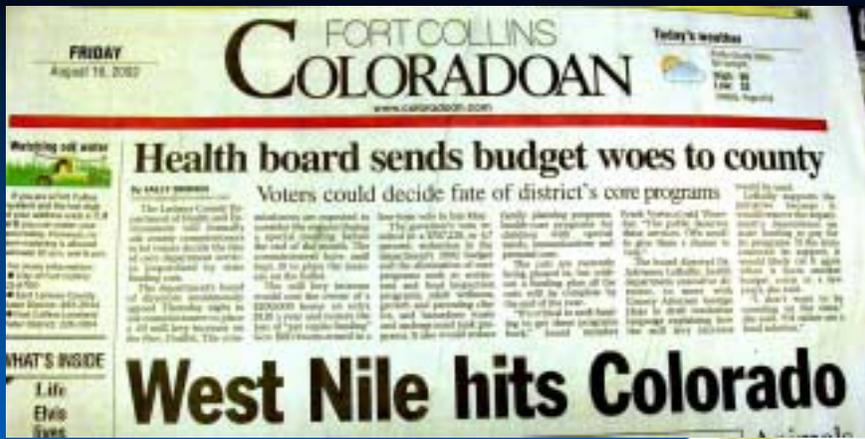


2002b – Blood and Transplantation

Discovery of New Modes of WNV Transmission

- Blood transfusion
- Solid tissue transplantation
- Intrauterine infection
- Breast feeding
- Percutaneous exposure

2003 – NIMBY = Not in my
backyard.



Welcome to
Colorful Colorado!



2003 Verified WNV Surveillance Reports

Year	States	Humans/ Fatalities	Birds	Mosquito Pools	Horses
1999	4	62/6	?	16	25
2000	11 + DC	21/2	4305	515	63
2001	27+DC	66/9	7332	919	731
2002	44 + DC	4156/284	15941	6604	14571
2003	46 + DC	9122/223	11613	7856	4533

WNV Epidemiological Milestones

- Household-based WNV seroprevalence studies – NY (1999, 2000 x 3), LA (2002), OH (2002)
- WNV poliomyelitis
- WNV fever and rash
- Long-term effects of WNV infection
- Actual cause of death in fatal WNV infections

Ecological/entomological Milestones

- Many field investigations to determine ecological and entomological aspects of outbreaks
- PCR-based mosquito species identification
- Vector-competence evaluations
- Pesticide susceptibility studies
- TaqMan-based virus identification from mosquito pools
- Animal host susceptibility evaluations

Milestones for diagnosis

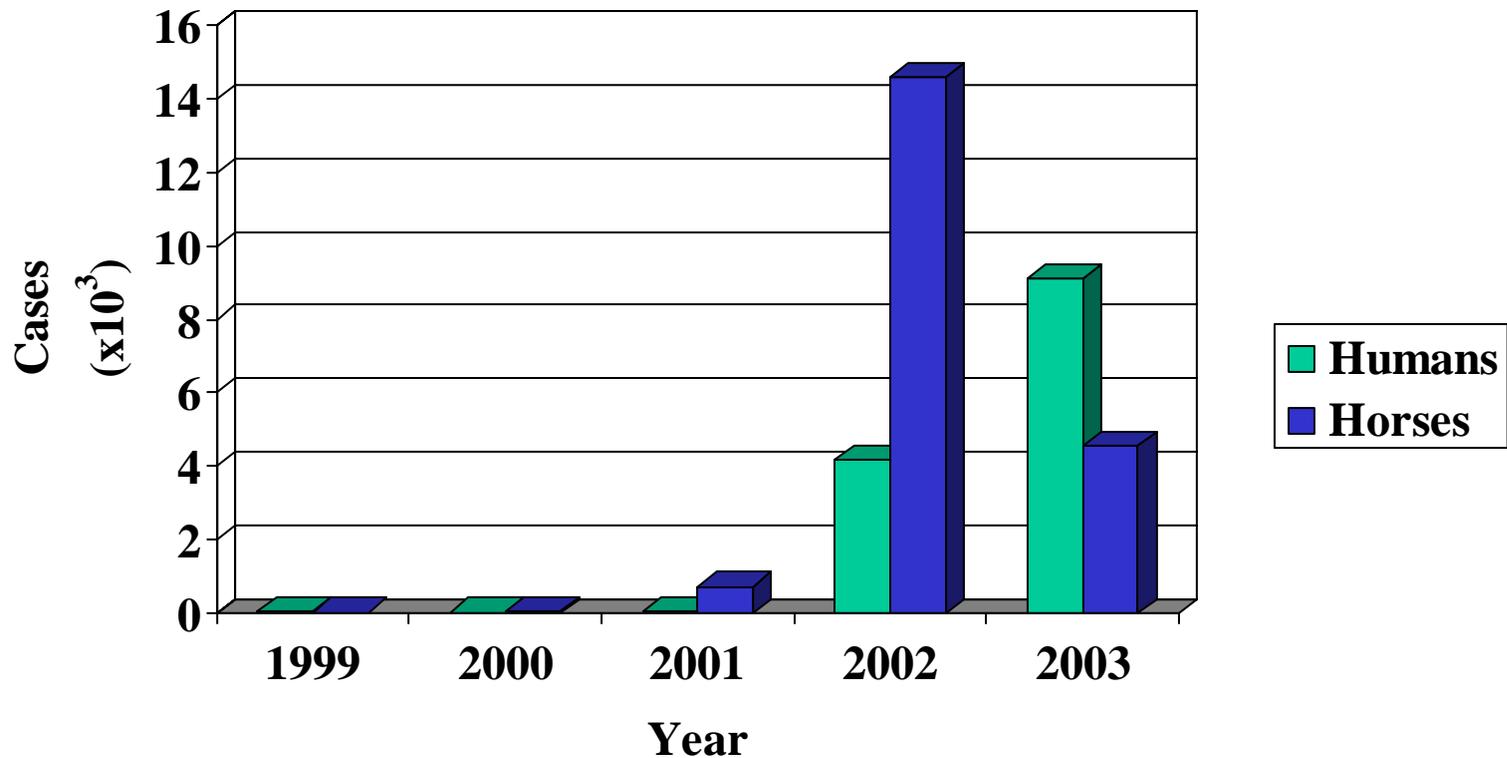
- All states have capacity for WNV diagnosis
- Commercialized reagents and testing for IgM (IgG) by ELISA
- Commercialization of TaqMan/NASBA assays
- New technology developments
 - Recombinant antigens
 - Chimerivax WN/YF and SLE/YF for diagnostic testing
 - Luminex assays

2004: Now playing coast-to-
coast WNV!

Or

California here I come...

Human and Equine WNV Cases in the U.S.



WNV in California 2003

- 32 positive mosquito pools
- 96 dead crows
- 70 sentinel chickens
- 3 humans
- 1 horse

WNV in California 2004

- Will WNV overwinter in CA? Yes
- Will SLE virus activity modulate the WNV activity in CA? No
- Will the WNV epidemic expand? Yes
- Will you be surprised by the "speed" and intensity of the outbreak? Yes
- Will you have lots of testing in 2004?
Yes

Letter for 2004:

P

As in “CDC&P”

“P” = Prevention

No currently approved and
effective vaccine

AND

No currently approved and
effective antivirals

Modes of WNV Transmission

- Blood transfusion
- Solid tissue transplantation
- Intrauterine infection
- Breast feeding
- Percutaneous exposure - occupational
- Mosquito bite

Weighted Modes of WNV Transmission

- **Blood transfusion**
 - Solid tissue transplantation
- **Intrauterine infection**
 - Breast feeding
 - Percutaneous exposure - occupational
- **Mosquito bite**

West Nile Virus National Meetings

1999 – Ft. Collins

2001 - Charlotte

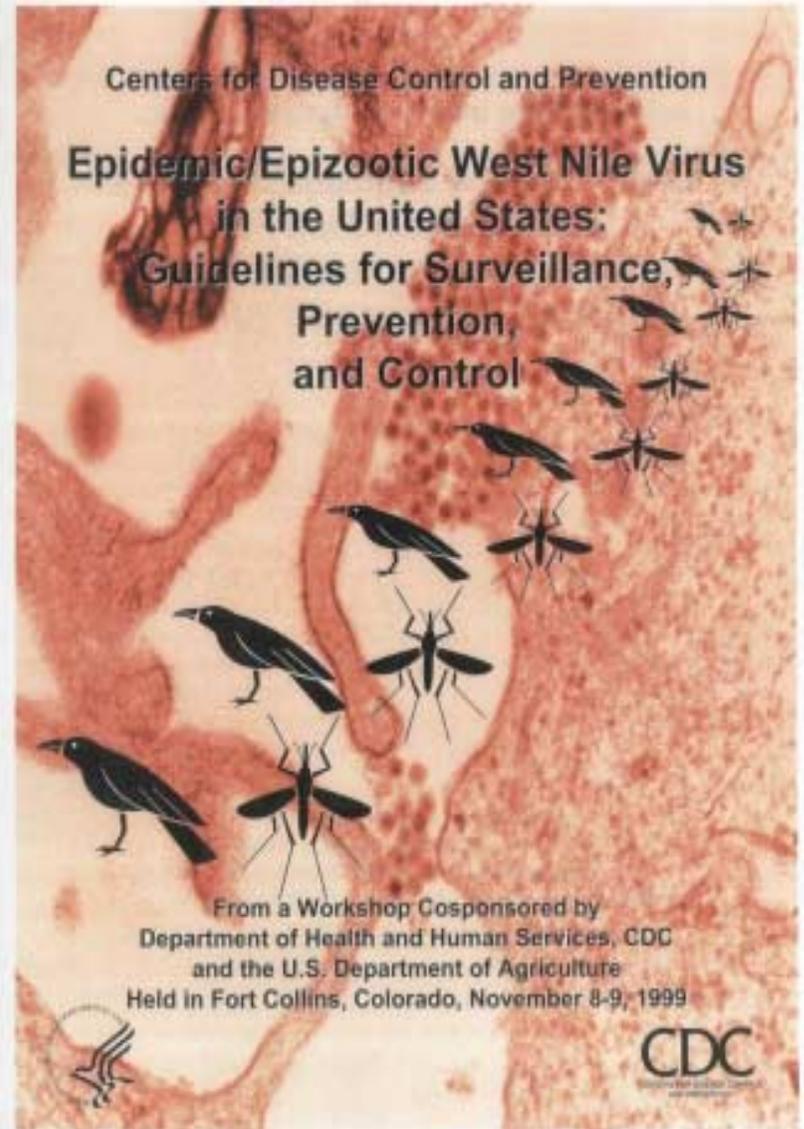
2002 - Atlanta

2003 – New Orleans

2004 - Denver

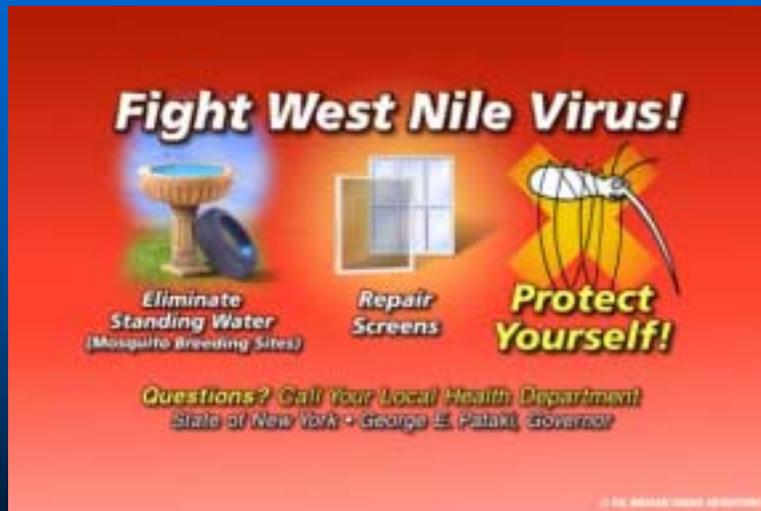
West Nile Virus Guidelines

2000, 2001, 2003



Intervention Program - Personal Protection

- Media information campaign
- DEET-based repellents/permethrin for clothing
- Long-sleeved/legged clothing
- Stay inside when mosquitoes are active



Intervention Program - Vector Control

- Surveillance
- Larval control
 - Map larval habitat
 - Identify and remove breeding sites
 - Reduce larvae - Larvicide or mosquito fish
- Adult control – adulticiding via aerial ULV, truck-mounted sprayers, or backpack sprayers



Simple Analysis of the Possible Effects of Adulticide Applications in the NYC 1999 WNV Outbreak vs. the WNV Outbreak in the Northern US 2002



Hypothesis: Mosquito control reduces WNV risk of human infection.

While the previous slide depicts a limited analysis, studies need to be designed and performed to prove or to disprove this hypothesis



WHAT'S THAT
FRAGRANCE
YOU'RE
WEARING?

DEET...

WEST NILE
VIRUS!!!

NICK PARKINSON
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